REMARKS

Review and reconsideration of the Office Action dated July 20, 2005, is respectfully requested in view of the above amendments and the following remarks.

Claim 14 was amended to reintroduce the adhesive layer thickness as found in original claim 1.

Applicants are pleased to see that the Examiner withdrawn his previous formalities rejections to the claims, and that the Examiner has withdrawn his previous:

1) anticipation rejection of Claims 14, 15, 19 and 20 over Van Bers (US 5,564,251); and
2) obviousness rejection of Claims 16-18 over Van Bers in view of Wood (US 5,721,302).

The Examiner now rejects:

Claim 14-34 under 35 USC §103(a) as being obvious over Van Bers (US 5,564,251) in view of Mobley (US 5,227,409).

Applicants respectfully submit that the cited references taken alone or in combination teach the subject matter of the present set of claims.

Very basically, the present invention addresses a well known problem - cracking or breaking of parquet floor coverings or of the underlying cement floor. Where the prior art addresses the problem by applying a thin layer of a very strong and rigid adhesive (harder than the concrete floor) usually using a toothed trowel such that gaps are formed, the present invention solves the problem in a quite different way - by using elastic adhesion, wherein a relatively thick layer of a low

shear strength adhesive is evenly applied over the adhered surfaces such that tensions are evenly distributed and tension peaks prevented.

Accordingly, Applicants respectfully submit that the present invention addresses a problem which is a recognized problem in the parquet flooring industry, and for which there has not yet been a reliable solution.

Namely, the problem that shear forces occurring between wood covering and cement floor can result in

- bowing out of the parquet wood,
- gaps or formation of splits,
- breakage of the adhesive joint, and even
- breakage of the sub-floor comprised of cement. This is in particular due to the fact that the shear strength of the cement floor is relatively low in comparison to the parquet adhesive according to DIN 281.

The inventive solution is based upon the idea of elastic adhesion, using a thick elastic adhesive layer, such that the forces occurring during expansion and shrinking of the parquet elements are transmitted to the sub-floor without an impermissible localized accumulation of forces and are distributed and evenly diffused within the adhesive layer over the entire adhesive surface. In order to achieve this, it is proposed in accordance with the invention that the adhesive layer has

- a thickness of 0.5 to 5 mm and
- in the hardened condition exhibits a shear strength which is less than that of the sub-floor.

Thereby it is achieved that, in the case of expansion or shrinking, the forces occurring at the adhesive layer are evenly distributed over the entire adhesive surface. There are no

force or tension peaks, which can lead to a release or to a break in the adhesive connection. The distribution of the forces ensures that the floor covering elements deform less in the case of excessive moisture or in the case of drying out. The covering elements are supported and held over large surface areas, without occurrence of breakage areas in the adhesive. Thereby, a bowing-out of the floor covering wood is avoided. On the other hand, in the case of drying out, the formation of gaps is reduced. Research has shown that the covering elements, in the case of absorbing excessive moisture, becomes somewhat compressed along their contact flanks. As a result of the pressing of wood, minor deformations occur within the wood in the edge area, which however are barely discernable from the outside. In the case of the inventive elastic adhesion, one obtains a substantially even surface loading or force distribution over the surface area. This means that the greater the adhered surface is, the greater is the force transmission or distribution. Besides this, a bonding is achieved in a way that protects the sub-floor. A substantially elastic joining also results in a substantial reduction in foot-step noise in comparison to the hard adhesives. The surprising benefit of the inventive floor covering adhesion is comprised therein, that despite low shear strength of the employed adhesive, the avoidance of tension peaks makes it possible to achieve a substantially higher force transmission than with the convention rigid DIN adhesives.

Applicants believe that all claims are in condition for allowance.

Compared with present Claim 14 the prior art fails to teach elastic adhesion, requiring: 1)the sub-floor is covered **evenly** to a **thickness of 0.5-5 mm** with a **cured adhesive**; 2) the

adhesive has a **shear strength less than 1.2 N/mm^2**; 3) **the shear strength of the adhesive is less than the shear strength of the sub-floor; and 4)** the cured adhesive is **a reaction adhesive.**

Nowhere in the cited references can be found any indication of recognition recognize the importance of choosing a specific adhesive that has: 1) shear strength of less than 1.2 N/mm^2 and 2) shear strength less than the shear strength of the sub-floor, and 3) is coated to a thickness for ensuring elastic adhesiveness.

According to the Examiner, it would have been obvious to one having ordinary skill in the art at the time of the invention to have the specific parameters for the adhesive material, since it has been held that discovering an optimum value of a parameter involves routine skills in the art.

Applicants note that the Van Bears reference (main cited reference) merely teaches gluing to the sub-floor. The present invention was specifically developed to solve the problem faced by the prior art: wood expands when absorbing moisture and shrinks when (re)drying, and hard adhesives either crack the wood or crack the floor.

Claim Rejections (Obviousness):

The Examiner rejects Claim 14-34 under 35 USC §103(a) as being obvious over Van Bers (US 5,564,251) in view of Mobley (US 5,227,409).

The Examiner's statements may be found on pages 2-4 of the Office Action.

Applicants respectfully traverse.

Regarding the Van Bers Reference

Compared with Claim 14 tVan Bers fails to teach elastic adhesion wherein: 1) the sub-floor is covered with a **cured adhesive**; 2) the adhesive has **shear strength less than 1.2 N/mm^2**; 3) **the shear strength of the adhesive is less than the shear strength of the sub-floor;** and 4) the cured adhesive is **a reaction adhesive, and 5) the thickness of the adhesive is 0.5-5 mm.**

Van Bers uses glue or an adhesive strip. Glue has a maximum shear strength of 6.9 MPa and a minimum shear strength of 1.4 MPa. Thus, **glue does not meet the criteria required by the present set of claims.**

Regarding Mobly

Applicants note that the Examiner recognizes that Van Bers does not teach: 1) a cured adhesive; and 2) the adhesive is a reaction adhesive. According to the Examiner, it would have been obvious to one having ordinary skill in the art at the time the invention was made to choose a specific adhesive material to apply for desirable application.

Applicants respectfully traverse.

Mobley does not suggest elastic adhesion to solve the problem of tension cracks in parquet floors.

Mobley teaches the use of a polyurethane adhesive, which is the reaction product of a mixture. (Column 2, lines 30-36). Furthermore, the reference teaches that the adhesive is washable with water. (Column 2, lines 17 and 23-26).

Mobley does not overcome the deficiencies of Van Bers. The Mobley reference **also** fails to teach: 1) the cured adhesive is **a reaction adhesive**; 2) the adhesive has **shear strength less**

than 1.2 N/mm^2; and 3) **the shear strength of the adhesive is less than the shear strength of the sub-floor.**

We note that Mobley uses an adhesive made of a polyurethane. Polyurethane has a maximum shear strength of 17.2 MPa and a minimum shear strength of 6.9 MPa. Thus, this bonding agent corresponds to the prior art and **does not meet the criteria required by the present set of claims.**

Further, Mobley is not directed to flooring. Thus, the reference fails to address the point of the shear strength of the sub-flooring.

Neither of the references taking alone or in combination teach the present invention, because both references fail to teach the features point of the present invention wherein elastic adhesion is applied to evenly distribute tension and prevent cracking of parquet and floor by deliberately ensuring:

1) the cured adhesive is **a reaction adhesive**;

2) the adhesive is applied to a thickness of 0.5 to 5 mm;

2) the adhesive has **shear strength less than 1.2 N/mm^2**; and

3) **the shear strength of the adhesive is less than the shear strength of the sub-floor.**

Nowhere in the reference can be found any indication that Van Bers recognizes the importance of choosing a specific adhesive that has: 1) a shear strength of less than 1.2 N/mm^2 ; and 2) a shear strength less than the shear strength of the sub-floor.

According to the Examiner, it would have been obvious to one having ordinary skill in the art at the time of the invention to have the specific parameters for the adhesive

material, since it has been held that discovering an optimum value of a parameter involves routine skill in the art.

Applicants note that the Van Bears reference is not teaching any improvement over the prior art: a layer is glued to the sub-floor. The present invention was specifically developed to solve the problem faced by the prior art: wood expands when absorbing moisture and shrinks when (re)drying.

The wood conventionally contains 9% water during the laying process. The moisture content can change due to water uptake in new construction through the sub-floor, or from the environment, or as a result of the variable humidity depending upon the season. The expansion and shrinking caused thereby must be absorbed or accepted by the adhesive material. Thereby, substantial shear forces result. These shear forces can, in certain cases, result in a bowing out of the wood or result in gaps or formation of splits. In the case of breakage it frequently occurs that not only the adhesive joint but rather also the sub-floor comprised of cement is damaged. This is due to the fact that the shear strength of the cement floor is relatively low in comparison to the wood adhesive. On the other hand, during the drying of the wood, pieces shrink. Since the wood adhesive does not permit a shrinking at the point of adhesion, frequently large gaps occur between the parquet pieces.

The present inventors realized that forces occurring during the expansion and shrinking of the wood elements can only be transmitted to the sub-floor without an impermissible localized accumulation of forces when they are distributed and evenly diffused, within the adhesive layer, over the entire adhesive surface.

After extensive research, the present inventors discovered that the problem could be solved by an **elastic adhesion approach** rather than a hard and rigid approach. Thereby it is achieved that, in the case of expansion or shrinking, the forces occurring at the adhesive layer are evenly distributed over the entire adhesive surface. There are no force or tension peaks, which can lead to a release or to a break in the adhesive connection. The distribution of the forces ensures that the floor covering elements deform less in the case of excessive moisture or in the case of drying out.

The covering elements are supported and held over large surface areas, without occurrence of breakage areas in the adhesive. Thereby, a bowing-out of the floor covering wood is avoided.

The surprising benefit of the inventive floor covering adhesion is comprised therein, that despite low shear strength of the employed adhesive, the avoidance of tension peaks makes it possible to achieve a substantially higher force transmission than with the convention rigid DIN adhesives.

Regarding Claim 16

The Examiner cited the Mobley reference to show that adhesive is comprised of a reaction-type resin, which hardens upon exposure to water.

Mobley teaches that when the adhesive is washed with water and (column 2, lines 17 and 23-26) retains its tackiness. Thus, the adhesive according to Mobley does harden upon exposure with water.

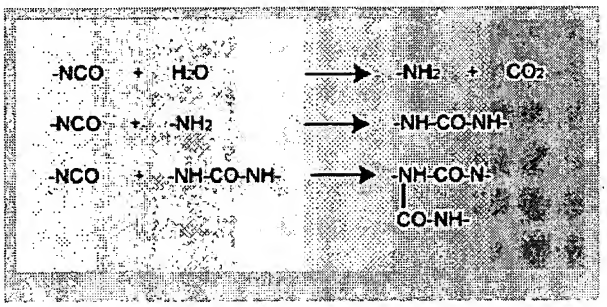
The present invention in contrast requires a cured **adhesive** having shear strength of less than 1.2 N/mm^2 (low shear

strength). Thus, in the hypothetical case that the Van Bears floor is modified by using the adhesive according to Wood, the combination of references will not teach the limitation of present Claim 16, because the adhesive will not meet the criteria of the adhesive according to the claim.

Applicants would like to explain to the Examiner the chemical reaction that takes place during the curing of the water reactive adhesive. To explain the reaction, Applicant is refereeing specifically to polyurethane (Claim 17).

Moisture curing polyurethane adhesives (Claim 17) are actually based on isocyanate polymers. These are low molecular weight, linear polymer molecules, with isocyanate (-NCO) end groups.

The isocyanate end-groups react with any compound containing an active hydrogen, e.g., alcohols, amines, or other polyurethanes and ureas. The water vapor initiates the chemical reaction with the isocyanate groups as shown below. This results in increased molecular weight and cross-linking of the pre-polymer into a strong, tough film.



The reaction involves a two-stage process. The water and the isocyanate groups first producing an amine and carbon dioxide. The amine then reacts with other isocyanate groups to

form a urea until all available isocyanates are consumed. Carbon dioxide generated during the process leaves the film through diffusion and evaporation.

Because surface moisture completes the chemical reaction in moisture-cured polyurethane, these materials adhere well to visibly damp surfaces. They penetrate into pores and tight crevices where moisture is usually present to form strong chemical bonds. Since moisture is consumed in the process, the risk of blisters or a weak boundary layer caused by water trapped under the coating is greatly reduced.

Un-obviousness

Applicants rely on In Ex parte Viscardi, 136 USPQ 382, wherein the applicant discovered that addition of carbon dioxide to a printing press will remove static electricity. The Examiner rejected the application over a reference which taught addition of carbon dioxide, but for a different reason. The court held that there is merit in the contention that a reference patent does, as urged by the Examiner, inherently provide carbon dioxide,which will remove static electricity. **However, in the absence of appreciation by patentee (the reference) of the fact that carbon dioxide will remove static electricity, there is no reason why he, or one skilled in the art following his teaching, should inherently adjust the concentration of carbon dioxide for removal of complete static charge; hence, manipulative steps of applicant's claims do not inherently result from reference's disclosure.**

Thus, in the absence of appreciation by patentee Van Bers of the fact that choosing an adhesive having sufficient elasticity to evenly distribute tension and allow expansion and

contraction, namely, having a thickness of 0.5-5 mm and having a shear strength of less than 1.2 N/mm^2 and less than the shear strength of the sub-floor will allow that in the case of expansion or shrinking, the forces occurring at the adhesive layer are evenly distributed over the entire adhesive surface; thus, preventing forces or tension peaks, which can lead to a release or break in the adhesive connection that deform the floor.

There is no reason why Van Bears, or one skilled in the art following his teaching, should inherently choose an adhesive based on the shear strength to prevent damage to the floor or sub-floor. In short, the manipulative steps of applicant's group of claims does not inherently result from the disclosure of the basic reference.

Claims 15 and 19-20 are novel in view of their dependency with novel Claim 14.

Favorable consideration and early issuance of the Notice of Allowance are respectfully requested. Should further issues remain prior to allowance, the Examiner is respectfully requested to contact the undersigned at the indicated telephone number.

Respectfully submitted,

AKERMAN SENTERFITT

Dated: January 20, 2006

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